Supreme Court, U.S.
FILED
991287 JAN 3 1 2000

No. 99-

IN THE

Supreme Court of the United States

MITSUBISHI ELECTRIC CORPORATION,

Petitioner,

v.

AMPEX CORPORATION,

Respondent.

ON PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

PETITION FOR A WRIT OF CERTIORARI

LES J. WEINSTEIN
Counsel of Record
MARTIN J. TRUPIANO
VINCENT J. BELUSKO
GRAHAM & JAMES LLP
Attorneys for Petitioner
801 South Figueroa Street
14th Floor
Los Angeles, CA 90017
213-624-2500

157561

Counsel Press LLC
(800) 274-3321 • (800) 359-6859

COPY

QUESTIONS PRESENTED

1. Whether a jury's general verdict may be properly affirmed after appellate review of only one of multiple legal theories on which it may have rested, contrary to the long-established rule of *Sunkist Growers, Inc. v. Winckler & Smith Citrus Products Co.*, 370 U.S. 19, 29-30, 82 S. Ct. 1130, 1136, 8 L. Ed. 2d 305, 312 (1962), which holds that a general verdict may be affirmed only if each theory was free from error.

2. Whether a general verdict may be properly affirmed upon an appellate determination that a single claim or defense that the jury may have decided in the verdict loser's favor was supported by substantial evidence.

3. Whether a party, after unsuccessfully proposing a special verdict form, waives its Seventh Amendment right to trial by jury by not objecting to the use of a general verdict form where multiple theories are advanced in support of a claim or defense.

STATEMENT PURSUANT TO RULE 29.6

Mitsubishi Electric Corporation does not have a parent corporation, and there are no publicly-held corporations which own 10% or more of its stock.

TABLE OF CONTENTS

	Page
Questions Presented	i
Statement Pursuant to Rule 29.6	ii
Table of Contents	iii
Table of Cited Authorities	v
Table of Appendices	vii
Opinions Below	1
Statement of Jurisdiction	1
Constitutional Provisions Involved	1
Statement of the Case	2
Prior Proceedings	5
Reasons for Granting the Writ	7
A. The Federal Circuit's Decision That An Objection To The Form Of The Verdict Is Required to Preserve The Standard Of Review Mandated By *Sunkist* Is Contrary To The Long-Established Law Of This Court	7

Contents

Page

B. The Federal Circuit's Ruling That A Failure to Object to the General Verdict Form Constitutes a Waiver Impermissibly Impairs the Right to Trial by Jury 10

Conclusion 12

TABLE OF CITED AUTHORITIES

Page

Cases:

Atmel Corp. v. Information Storage Devices, Inc., 1999 U.S. App. LEXIS 34441 (Fed. Cir., Dec. 28, 1999) 5

Cardinal Chemical Co. v. Morton Int'l, Inc., 508 U.S. 83, 113 S. Ct. 1967, 124 L. Ed. 2d 1 (1993) 4

Dimick v. Schiedt, 293 U.S. 474, 55 S. Ct. 296, 79 L. Ed. 603 (1935) 11

Markman v. Westview Instruments, Inc., 52 F.3d 967 (Fed. Cir. 1995) (*en banc*), *aff'd*, 116 S. Ct. 1384 (1996) 9

Maryland v. Baldwin, 112 U.S. 490, 5 S. Ct. 278, 28 L. Ed. 822 (1884) 2, 3, 8

Minneapolis & St. Louis R.R. Co. v. Bombolis, 241 U.S. 211, 36 S. Ct. 595, 60 L. Ed. 961 (1916) 10

Robotic Vision Systems, Inc. v. View Engineering, Inc., 189 F.3d 1370 (Fed. Cir. 1999) 9

Royal Typewriter Co. v. Xerographic Supplies Corp., 719 F.2d 1092 (11th Cir. 1983) 8

Cited Authorities

Page

Sunkist Growers, Inc. v. Winckler & Smith Citrus Products Co., 370 U.S. 19, 82 S. Ct. 1130, 8 L. Ed. 2d 305 (1962) ..... i, 2, 3, 6, 7, 8, 9, 10, 12

United New York and New Jersey Sandy Hook Pilots Association v. Halecki, 358 U.S. 613, 79 S. Ct. 517, 3 L. Ed. 2d 541 (1959) 8

Warner-Jenkinson Co. v. Hilton-Davis Chemical Co., 520 U.S. 17, 117 S. Ct. 1040, 137 L. Ed. 2d 146 (1997) 4

Statutes:

28 U.S.C. § 1254 1

35 U.S.C. § 282 9

United States Constitution:

United States Constitution, amend. VII 1, 10, 12

United States Constitution, art. 1 § 8, cl. 8 1

Rules:

Fed. R. Civ. P. 46 6

Fed. R. Civ. P. 49 8

Other Authority:

9 Wright & Miller, *Federal Practice and Procedure: Civil*, § 2505 (1995) 8

TABLE OF APPENDICES

Page

Appendix A — Opinion Of The United States Court Of Appeals For The Federal Circuit Dated August 30, 1999 ..... 1a

Appendix B — Order Of The United States District Court For The Central District Of California Denying Plaintiff's Motion For Judgment As A Matter Of Law Or For A New Trial Dated And Filed June 30, 1997 ..... 30a

Appendix C — Special Verdict Form Of The United States District Court For The Central District Of California Dated And Filed March 26, 1997 ... 32a

Appendix D — Order Of The United States Court Of Appeals For The Federal Circuit Denying Petition For Rehearing Dated And Filed November 1, 1999 ..... 38a

Mitsubishi Electric Corporation ("Mitsubishi") respectfully petitions for a writ of certiorari to review the judgment of the United States Court of Appeals for the Federal Circuit in this case.

OPINIONS BELOW

The opinion of the court of appeals is reported at 190 F.3d 1300. There are no published district court opinions.

STATEMENT OF JURISDICTION

The Court of Appeals entered judgment on August 30, 1999. A timely Petition for Rehearing was served and filed on September 10, 1999, and was denied on November 1, 1999. The jurisdiction of this Court is invoked under 28 U.S.C. § 1254.

CONSTITUTIONAL PROVISIONS INVOLVED

United States Constitution, amend. VII:

> In Suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury, shall be otherwise reexamined in any Court of the United States, than according to the rules of the common law.

United States Constitution, art. 1 § 8, cl. 8:

> To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.

STATEMENT OF THE CASE

Contrary to more than 100 years of precedent of this Court, the Federal Circuit's decision stands for the remarkable and erroneous proposition that by not formally objecting to a trial court's unreviewable, discretionary act of selecting the form of the verdict, a party waives its Seventh Amendment right to a trial by jury. Even more remarkable is that with no prior notice that such an objection was required, the Federal Circuit retroactively imposed this new requirement to invalidate a United States patent.

In *Sunkist Growers, Inc. v. Winckler & Smith Citrus Products Co.*, 370 U.S. 19, 29-30, 82 S. Ct. 1130, 1136, 8 L. Ed. 2d 305, 312 (1962), this Court reaffirmed the rule originally set forth in *Maryland v. Baldwin*, 112 U.S. 490, 493, 5 S. Ct. 278, 28 L. Ed. 822 (1884), that in reviewing a jury's general verdict based on multiple theories, the verdict cannot be upheld if any one theory was submitted to the jury in error. In contrast, the Federal Circuit's August 30, 1999 precedential Opinion holds that where the verdict loser "fails" to object to the trial court's use of a general verdict form — after that party's proposed special verdict form was rejected — a reviewing court may uphold the jury's verdict if but one of multiple theories is submitted to the jury free from error.

The Federal Circuit's decision is in conflict with three prior decisions of this Court. The "justification" provided in the Federal Circuit decision for departure from this clear precedent is a new requirement, never previously imposed by this or any other federal court, of the need for a formal objection to the use of a general verdict form. There is no suggestion in this Court's precedents that an objection to

the use of a general verdict form is a prerequisite to application of the *Sunkist* standard. Moreover, the Federal Circuit's opinion conflicts with a body of authority which uniformly holds that selection of the form of the verdict is a matter within the discretion of the trial court, the exercise of which has never been held to constitute error. However, the court of appeals then seized upon the lack of a formal objection to the verdict form to abdicate its appellate responsibility and repudiate this Court's decision in *Sunkist.* The Federal Circuit's decision upholds a general verdict if any *one* theory is supported by substantial evidence and radically departs from *Sunkist's* rationale that benefit of the doubt be given to verdict losers when a general verdict form is used in cases where there are multiple claims or defenses at issue. The court of appeals decision is contrary to the uniform treatment of the review of multiple-theory, general verdicts since this Court's decision in *Maryland v. Baldwin.*

The Federal Circuit's decision also impermissibly impairs the right to trial by jury under the Seventh Amendment. In holding that the *Sunkist* rule can be disregarded if no objection is made to the trial court's decision to use a general verdict form, the Federal Circuit grants the reviewing court license to abrogate its obligation to assure that *each* of the claims or defenses subsumed within the general verdict were properly before the jury. The Federal Circuit decision creates a fiction that the jury decided in the verdict winner's favor on each of the multiple legal theories submitted on the general verdict, whereas the *Sunkist* rule recognizes that all that can be properly inferred is that the jury found in favor of the verdict winner on one of those theories. The Federal Circuit's decision turns *Sunkist* on its head. It deprives litigants of their constitutional right to a trial by jury by permitting judgments to be affirmed based

on jury verdicts that may never have been reached. Under the Federal Circuit's new approach, a judgment on a general verdict could well be affirmed on a ground that the jury resolved in favor of the verdict loser, thereby vitiating the entire jury function.

The decision of the Federal Circuit creates an open invitation for trial courts to favor the use of general verdict forms in complex cases in which there are multiple claims and defenses and thus often render serious trial errors essentially non-reviewable by the appellate courts. In effect, the Federal Circuit decision impairs the right to a jury trial by stimulating the use of general verdicts to preclude a verdict loser's right to a new trial by showing reversible error on any *one* of the theories submitted to the jury. The potential mischief of the Federal Circuit's decision is evident and should not be allowed to stand.[1]

---

1. The Federal Circuit's decision runs counter to the purpose of its charter as the specially-created court of appeals to address frequently complex patent appeals because it truncates the review of mulitple claims or defenses when the court should be solicitous to carefully review a general verdict addressing such claims or defenses. *See, e.g., Warner-Jenkinson Co. v. Hilton-Davis Chemical Co.*, 520 U.S. 17, 39 n.8, 117 S. Ct. 1040, 1053, 137 L. Ed. 2d 146 (1997) (The Federal Circuit is responsible to treat jury verdicts in a manner to promote certainty, consistency, and reviewability); *cf., Cardinal Chemical Co. v. Morton Int'l, Inc.*, 508 U.S. 83, 113 S. Ct. 1967, 124 L. Ed. 2d 1 (1993) (reversed Federal Circuit's practice of routinely vacating judgments of validity after finding noninfringement and mandated review of declaratory judgment claims regarding validity).

Prior Proceedings

Mitsubishi brought this action against Ampex Corporation ("Ampex") for infringement of U.S. Patents nos. 4,336,612 and 4,665,533. The action was filed in late 1995, and was tried to a jury during March 1997. This petition relates solely to the '533 patent and the court of appeals' affirmance of the general jury verdict that it was invalid.

At trial, Ampex contended that the '533 patent was invalid under three separate theories — indefiniteness, anticipation and obviousness. After the court declined to use Mitsubishi's proposed special verdict which separately addressed Ampex's theories for invalidity,[2] the case was sent to the jury for decision on Ampex's general verdict form that simply asked whether the '533 patent was invalid.[3] The verdict returned by the jury found that Ampex literally infringed the '533 patent's sole claim, but that the claim was invalid. In accordance with the form of the verdict, the jury did not specify on which theory or theories of invalidity it had found the '533 patent invalid.

---

2. Mitsubishi's proposed, and rejected, special verdict form reflected two of Ampex's invalidity theories — obviousness and anticipation. As to Ampex's third theory based on indefiniteness, Mitsubishi took the position that it was not an issue for the jury but was a matter of law for the court. The trial court, however, declined to rule on indefiniteness, preferring for the jury to return a general verdict encompassing all three theories. Mitsubishi's position was later proven correct when the Federal Circuit ruled in *Atmel Corp. v. Information Storage Devices, Inc.*, 1999 U.S. App. LEXIS 34441 at *9 (Fed. Cir., Dec. 28, 1999), that the issue of indefiniteness is a question of law to be determined by the court.

3. Because Ampex's verdict form as to the invalidity defense did not break out each separate theory of that defense, that portion is properly characterized as a "general" verdict form. (App. at 36a).

Before the Federal Circuit, Mitsubishi challenged each of the three grounds on which the '533 patent could have been found invalid. Mitsubishi observed that under the rule established by this Court in *Sunkist*, 370 U.S. at 29-30, 82 S. Ct. at 1136, 8 L. Ed. 2d at 312, a new trial on validity would be required if it established that any one of the three theories of invalidity was submitted to the jury in error. As this Court has long recognized, this standard of review is a natural consequence of using a general verdict where multiple theories are involved.

However, the Federal Circuit's decision engrafted a new and additional requirement on the *Sunkist* rule. It characterized Mitsubishi's position on the standard of review as "argu[ing] that the generality of the ensuing verdict led to an unreviewable, and thus fatally flawed, judgment." (Opinion, App. at 7a). The Federal Circuit found that this was, in effect, an "objection" that should have been raised prior to the submission of the case to the jury, and that by failing to "press the argument for the separate theories of liability" Mitsubishi had failed to "preserve its objection to the form of the verdict." (Opinion, App. at 8a). The court of appeals reached this conclusion despite its acknowledgement that Mitsubishi's proffered special verdict form had been rejected by the trial court.[4] (Opinion, App. at 7a).

The Federal Circuit's ruling that Mitsubishi had waived the right to have the jury's verdict interpreted under the rule

4. Fed. R. Civ. P. 46 ("Formal exceptions to rulings or orders of the court are unnecessary; but for all purposes for which an exception has heretofore been necessary it is sufficient that a party, at the time the ruling or order of the court is made or sought, makes known to the court the action which the party desires the court to take or the party's objection to the action of the court and the grounds therefor . . . .").

of *Sunkist* has bizarre consequences and should not stand. As *Sunkist* and the numerous cases applying its rule recognize, the most that can be inferred from a general verdict on multiple theories is that the jury found for the prevailing party on one of those theories, but which one cannot be ascertained. In reviewing the jury's verdict of invalidity, however, the Federal Circuit found that it could uphold the verdict if any one theory was supported by substantial evidence. This holding enabled the Federal Circuit to limit its review to only one of the three invalidity theories, and to uphold the general verdict after finding that substantial evidence was presented on the one theory, notwithstanding that by virtue of the fact that only a general verdict was returned, the jury may have decided this theory in Mitsubishi's favor.

REASONS FOR GRANTING THE WRIT

A. The Federal Circuit's Decision That An Objection To The Form Of The Verdict Is Required to Preserve The Standard Of Review Mandated By *Sunkist* Is Contrary To The Long-Established Law Of This Court

No federal court has ever held, as the Federal Circuit did here, that a party can "waive" the legal standard for interpreting a general verdict by not objecting to the court's use of the general verdict form. This ruling is wrong, contrary to existing law, and sets a harmful precedent which can be used by trial courts to deny meaningful jury trials and by the court of appeals to prejudicially limit a verdict loser's right of review.

This Court has on three occasions addressed the standard of review of general verdicts on multiple theories — in *Maryland v. Baldwin*, 112 U.S. 490, 493, 5 S. Ct. 278, 28 L. Ed. 822 (1884), *United New York and New Jersey Sandy Hook Pilots Association v. Halecki*, 358 U.S. 613, 619, 79 S. Ct. 517, 3 L. Ed. 2d 541 (1959) and most recently, *Sunkist*. In none of these opinions is there any hint of a suggestion that an objection to the form of the verdict is a prerequisite to applying the proper standard of review. Moreover, the only reported federal decision to address whether the standard of review required by *Sunkist* can be waived, *Royal Typewriter Co. v. Xerographic Supplies Corp.*, 719 F.2d 1092, 1099 n.1 (11th Cir. 1983), flatly rejected the proposition on the ground that the form of the verdict "rests within the trial court's discretion." Accordingly, Mitsubishi understood that, even with the adoption of the general verdict form by the trial court, Ampex would bear the burden on appeal of establishing the existence of substantial evidence as to each one of its multiple invalidity theories.

The lack of an objection to an otherwise non-erroneous general verdict form[5] cannot alter the standard of review. The Federal Circuit's contrary opinion proffers no rational connection between a failure to object to a general verdict form selected by a trial court and the adoption of a truncated scope of review which assumes for the first time in federal jurisprudence that a general verdict on multiple claims or defenses may be affirmed if a single claim or defense was

---

5. A trial court's exercise of discretion under Rule 49 of the Federal Rules of Civil Procedure to use a general verdict form, as opposed to special interrogatories, has never been held to be error. 9 Wright & Miller, *Federal Practice and Procedure: Civil*, § 2505, pp. 164-165 (1995) ("there ought never be a reversal for use or nonuse of special verdicts").

properly submitted to the jury. The opinion provides no rationale because regardless of whether an objection has been made to a general verdict form, the inherent uncertainty of the jury's decision in multiple claim cases still persists. It is this very uncertainty which underlies the well-reasoned *Sunkist* rule. The Federal Circuit's decision to limit its scope of review to a single claim if there is a failure to object to the verdict form for the first time shifts the burden of that uncertainty to the verdict loser — an unprecedented change in the manner that general verdicts have been reviewed on appeal and a repudiation of Supreme Court precedent on this very issue. As this Court has repeatedly held, it is the uncertainty of the basis for a general verdict which underpins the *Sunkist* rule. Whether a party has objected to the verdict form does not change the applicability of the *Sunkist* rationale. A verdict loser is still entitled to a review utilizing the *Sunkist* rule that the verdict is subject to reversal unless each one of multiple claims or defenses were properly before the jury.

The Federal Circuit's newly engrafted requirement that an objection be made to the use of the general verdict as a condition to applying the *Sunkist* rule also undermines the statutory presumption of validity accorded to issued patents. 35 U.S.C. § 282. On issues of patent validity determined by a jury, the standard of review is whether substantial evidence supports the jury's verdict. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 975 (Fed. Cir. 1995) (*en banc*), *aff'd*, 116 S. Ct. 1384 (1996). A finding that a claim or defense is supported by substantial evidence, even in light of a clear and convincing standard of proof,[6] does not involve a particularly searching review. Merely because a party is able to muster what

6. *Robotic Vision Systems, Inc. v. View Engineering, Inc.*, 189 F.3d 1370, 1377 (Fed. Cir. 1999) (a party urging invalidity of a patent must meet a clear and convincing burden of proof).

amounts to substantial evidence does not mean that the countervailing evidence will not be overwhelming and persuasive to a jury. If this were not the case, there would be little argument over whether the substantial evidence versus a de novo standard of review was appropriate. Thus, the court of appeals' failure to review the basis for *each* defense substantially eroded the already modest hurdle a verdict winner must surmount to uphold the jury's general verdict and unjustifiably undermines a patent's statutorily presumed validity.

B. The Federal Circuit's Ruling That A Failure to Object to the General Verdict Form Constitutes a Waiver Impermissibly Impairs the Right to Trial by Jury

In *Sunkist*, this Court reaffirmed a rule designed to protect a party's right to trial by jury by requiring that each legal theory be properly before the jury before a general verdict may be upheld. A party should not be found to have "waived" this right by not objecting to an "unreviewable" exercise of discretion by the trial court in selecting the form of verdict, particularly where the waiver would operate to undermine the right to trial by jury. *Minneapolis & St. Louis R.R. Co. v. Bombolis*, 241 U.S. 211, 213, 36 S. Ct. 595, 60 L. Ed. 961 (1916) ("The 'right,' which is secured by the Seventh Amendment is not a matter of procedure, but of substance, and one possessing such right cannot be deprived of it by any means short of an amendment to the Constitution"). By denying the right to have a jury's verdict interpreted under the legal standard mandated by this Court in *Sunkist*, the Federal Circuit's opinion deprives litigants of their Seventh Amendment right to a jury trial, a result

which is especially troubling given the court of appeal's charter to provide special consideration to patent suits.

In *Dimick v. Schiedt*, 293 U.S. 474, 486, 55 S. Ct. 296, 301, 79 L. Ed. 603 (1935), this Court held that:

> Maintenance of the jury as a fact-finding body is of such importance and occupies so firm a place in our history and jurisprudence that any seeming curtailment of the right to a jury trial should be scrutinized with the utmost care.

The level of scrutiny contemplated in *Dimick* is plainly absent from the Federal Circuit's opinion. Although three invalidity defenses were tried to the jury, the jury's actual verdict on those defenses was discarded and substituted with the fiction that invalidity was separately found on each defense. The fact that it cannot be known whether the jury actually reached that result is not even acknowledged.

CONCLUSION

The Federal Circuit's mistaken view that a party's failure to object to the trial court's use of a general verdict form somehow "trumps" the standard of review mandated under *Sunkist* has the potential to undo over a century's worth of this Court's precedent. This dangerous new ruling impermissibly encroaches on the Seventh Amendment right to trial by jury and improperly invites lower courts to shield jury verdicts in complex cases from effective review through the use of general verdicts. The need for this Court's intervention, therefore, is imperative.

The petition for a writ of certiorari should be granted.

Respectfully submitted,

LES J. WEINSTEIN
Counsel of Record
MARTIN J. TRUPIANO
VINCENT J. BELUSKO
GRAHAM & JAMES LLP
Attorneys for Petitioner
801 South Figueroa Street
14th Floor
Los Angeles, CA 90017
213-624-2500

APPENDIX

APPENDIX A — OPINION OF THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT DATED AUGUST 30, 1999

MITSUBISHI ELECTRIC CORPORATION,

Plaintiff-Appellant,

v.

AMPEX CORPORATION,

Defendant-Cross-Appellant.

Nos. 97-1502, 97-1538.

United States Court of Appeals,
Federal Circuit.

Aug. 30, 1999.

* * *

Before NEWMAN, Circuit Judge, SKELTON, Senior Circuit Judge, and LOURIE, Circuit Judge.

PAULINE NEWMAN, Circuit Judge.

Mitsubishi Electric Corporation appeals the judgment of the United States District Court for the Central District of California, concerning Mitsubishi's United States Patent No. 4,336,612 ("the '612 patent") and United States Patent

No. 4,665,533 ("the '533 patent").[1] The jury verdict was that the asserted claims of both patents were invalid and that none of the asserted claims of the '612 patent was infringed either literally or under the doctrine of equivalents, but that claim 1 of the '533 patent was literally infringed if valid. On appeal Mitsubishi requests either a new trial or judgment in its favor as a matter of law. Ampex has filed a conditional cross-appeal of the verdict that it infringes the '533 patent.

The district court entered judgment on the jury verdicts and denied all post-trial motions. We affirm the judgment.

I
THE '612 PATENT

The '612 patent, entitled "Error Correction Encoding and Decoding System" granted on June 22, 1982, is directed to a system for correcting errors that occur during the transmission, recording, or reproduction of digital information. For example, in making a digital recording of music on magnetic tape, errors may occur when a particle of dust lands on a recording head. This dust can cause strings of erroneous binary bits, called a "burst error." In the error correction system of the '612 patent, digital information (the data to be transmitted or recorded or reproduced) is arranged in an array of bits and is encoded, such that when errors occur they can be located and corrected on decoding, allowing accurate recovery of the original information.

---

1. Mitsubishi Electric Corp. v. Ampex Corp., No. CV 95-8236-ER (C.D. Cal., April 24, 1997).

Appendix A

According to the '612 patent, the digital information is divided into a two-dimensional rectangular array of bits, described as an array of k_1 bits in the horizontal direction and an array of k_2 bits in the vertical direction. During encoding, error correcting codes are used to add check information to the data in each direction. An error correcting code C_2 is used for data in one direction of the array, and an error correcting code C_1 is used for data in the second direction of the array. The term "product code" refers generally to the use of these codes. Because the system uses these codes for data in both the horizontal and the vertical directions, the system's error correction capability is enhanced. Claim 1 of the '612 patent describes the claimed system as follows:

> 1. An encoding and decoding system for digital information having a rectangular array of bits including k_1 bits in a first direction and k_2 bits in a second direction orthogonal to the first direction which system comprises
>
> encoding means including an encoding adapting circuit for codes C_2 for dividing the k_1 bits in the first direction into b bits apiece, and forming a plurality of k_2 X b bit rectangular arrays each including the b bits in the first direction and the k_2 bits in the second direction,
>
> a C_2 encoder for encoding the plurality of k_2 X b bit rectangular arrays into a plurality of n_2 X b bit rectangular arrays each including the

Appendix A

b bits in the first direction and n_2 bits in the second direction,

a C_1 encoder for encoding the k_1 bits in the first direction into n_1 bits by adding n_1-k_1 check bits to the k_1 bits in the first direction,

and a timing generator circuit for generating timing signals for controlling the operation of said encoding means to thereby encode the digital information into a codeword of a generalized product code including the n_1 bits in the first direction and the n_2 bits in the second direction;

and decoding means operatively connected to said encoding means by a transmission means for decoding the digital information encoded by the encoding means;

wherein said C_1 and C_2 encoders are operative to encode in response to said timing signals of said timing generator and wherein either said C_1 encoder or said C_2 encoder provides said generalized product code.

Claim 2 adds an information matrix-forming circuit for arranging digital information into a rectangular array of bits, and claim 3 describes the information matrix-forming circuit as containing RAM devices and selector means. Claim 11 adds elements including an erasure weight calculation circuit and an erasure location calculation circuit.

Appendix A

The explanation of this technology and much of the discussion of its technological and legal significance was presented at trial through the testimony of expert witnesses. Experts for both sides testified to the meaning of various technical terms as used in this system, the scope of the claims as applied to the accused device, the content of the prior art, the relation of the patented technology to the prior art, and other aspects relating to both validity and infringement. The issues at trial, and indeed on appeal, were complex in fact and law. No challenge is raised as to the technical competence and admissibility of the expert testimony, see generally Kumho Tire Co. v. Carmichael, 526 U.S. 137, 119 S.Ct. 1167, 143 L.Ed.2d 238 (1999), although the parties dispute the opinions expressed and the conclusions drawn by the expert witnesses.

The district court, and the Federal Circuit on appeal, each reviewing the jury's verdicts, must determine whether the law was correctly stated, including the jury instructions on claim construction, and whether there was substantial evidence to support the jury's verdicts. See, e.g., Al-Site Corp. v. VSI Int'l, Inc., 174 F.3d 1308, 1314, 50 U.S.P.Q.2d 1161, 1164 (Fed.Cir.1999) (after interpreting the claims, district court instructed jury to apply its construction of the claims to determine infringement); Shatterproof Glass Corp. v. Libbey-Owens Ford Co., 758 F.2d 613, 626, 225 U.S.P.Q. 634, 643 (Fed.Cir.1985) (In reviewing a district court's denial of a motion for new trial, we review the jury instructions as a whole to determine whether clear error occurred, such that the jury was misled.).

Appendix A

A. The Verdict of Invalidity of the '612 Patent

The verdict form asked the jury to decide, as to each claim in suit, whether the claim was proven invalid by clear and convincing evidence. The verdict form did not distinguish among the three principal grounds of invalidity that had been argued at trial: (1) obviousness in view of a publication by the inventors over a year before the filing of the continuation-in-part application that became the '612 patent, (2) an invalidating public use based on a demonstration at an Audio Engineering Society convention, and (3) an invalidating public use and sale of an IBM device, the IBM 3850, described as closely similar to the Mitsubishi device.

Mitsubishi states that if any one of these three grounds was erroneously submitted for jury verdict, the verdict must be vacated and a new trial granted because it is not possible for the appellate court to know whether the verdict was founded on the ground that was submitted in error. Mitsubishi also states that its "challenge to the jury's invalidity verdicts is premised on the absence of substantial evidence to support the legal theories underlying those verdicts."

The Supreme Court has ruled that when liability is argued to the jury on alternate legal theories, one of which is not legally correct or is not a permissible jury question, a general verdict of liability can not stand lest it have been based on the incorrect or impermissible theory. In Maryland v. Baldwin, 112 U.S. 490, 5 S.Ct. 278, 28 L.Ed. 822 (1884) the Court stated of a general verdict that "its generality prevents us from perceiving upon which plea they found. If,

therefore, upon any one issue error was committed, either in the admission of evidence or in the charge of the court, the verdict cannot be upheld. . . ." Id. at 493, 5 S.Ct. 278. This principle has been applied to multiple claims as well as to multiple theories, when one of the claims or theories should not have been submitted to the jury. See Sunkist Growers, Inc. v. Winckler & Smith Citrus Prods. Co., 370 U.S. 19, 82 S.Ct. 1130, 8 L.Ed.2d 305 (1962); United New York & New Jersey Sandy Hook Pilots Assoc. v. Halecki, 358 U.S. 613, 79 S.Ct. 517, 3 L.Ed.2d 541 (1959).

Although the Ninth Circuit, in which this case was tried, has recognized an exception whereby the district court has discretion to depart from this general rule, see Traver v. Meshriy, 627 F.2d 934, 938 (9th Cir.1980), we need not consider the applicability of this procedure, for Mitsubishi did not preserve an objection on this ground, and has not shown that any ground of invalidity was improperly presented for jury verdict.

Before the case was submitted to the jury, Mitsubishi submitted a proposed verdict form that separated various grounds of invalidity. In response to the trial court's concern about undue complexity, the verdict form was revised, collapsing these grounds into a single question of invalidity. Mitsubishi argues that the generality of the ensuing verdict led to an unreviewable, and thus fatally flawed, judgment. Ampex, on the other hand, argues that based on the procedures and statements before the district court, Mitsubishi waived this objection to the form of the verdict.

Appendix A

In response to Ampex's waiver argument, Mitsubishi directs us to the trial judge's statements regarding verdict form simplification and to the fact that Mitsubishi raised its arguments relating to the form of verdict in post-trial motion. Mitsubishi emphasizes that it originally proposed a fully itemized verdict form. Mitsubishi also states that it "does not claim that the use of the general verdict was in error," and that its only concern is that we can not, on appeal, review the verdict because we do not know its legal basis. However, the time to raise this objection was before submission of the case to the jury. Mitsubishi had argued that the verdict form should include special interrogatories for each claim, yet did not press the argument for the separate theories of invalidity. We conclude that Mitsubishi did not preserve its objection to the form of the verdict as grounds for reversal or a new trial. See Hoechst Celanese Corp. v. BP Chemicals Ltd., 78 F.3d 1575, 1581, 38 U.S.P.Q.2d 1126, 1131 (Fed.Cir.1996) (appellant waived objection by acquiescing in and proposing the verdict form); McCord v. Maguire, 873 F.2d 1271, 1274 (9th Cir.1989) amended by 885 F.2d 650, 650 (9th Cir.1989) (where appellant challenged general verdict based on insufficient evidence for various factual theories underlying verdict but where, at trial, appellant did not request a special verdict as to each factual theory, appellant waived right to raise such a challenge); 9 James Wm. Moore et al., Moore's Federal Practice §49.20[5] (3d ed.1997) (to avoid possible waiver on subsequent appeal, the objection to the form or content of special interrogatories must be made before the jury is discharged).

Nonetheless, we have reviewed the evidentiary basis for issues on which Mitsubishi relies in its argument that there

was not substantial evidence to support the jury verdict. A principal issue was the nature and content of a Mitsubishi demonstration at an Audio Engineering Society (AES) convention. Although Mitsubishi did not dispute that a device was demonstrated in May 1978, the parties disputed whether the invention as recited in the claims was used at the demonstration. Mitsubishi describes the demonstrated device as "some prototype device, whatever its structure" and states that there was no evidence of encoding/recording at the demonstration. Thus Mitsubishi argues that there was not substantial evidence that the claimed invention was used in public, and that the question of invalidity based on public use should not have been presented to the jury.

Witnesses presented testimonial, documentary, and opinion evidence on the issue. There was a 1978 report written by one of the Mitsubishi inventors, which included circuit diagrams of the recorder that was present at the AES convention and of its encoding and decoding circuitry. The inventor's report stated that "the performance" of the device was demonstrated, and the inventor testified that the demonstration device had encoding and decoding circuitry but that he could not remember whether this circuitry was used in the demonstration. There was also testimony that the demonstration included a tape editing demonstration. Ampex's expert witness testified that based on his review of the written and testimonial evidence, the invention of the '612 patent was used at the demonstration.

There was no criticism of the jury instruction on the applicable law, which was as follows:

Appendix A

> A public use for the purpose of barring access to the patent system is a use for more than a year before the patent's earliest effective filing date, whereby [the] completed "invention" is used in public, without restriction and in circumstances other than substantially for the purpose of experiment. The test is not whether the invention was present at a public place but whether it was actually used in public as recited in the claims of the patent.

Although both sides debate issues of credibility and recollection after the passage of eighteen years, we conclude that the documentary evidence itself could support a finding that the claimed invention was used in public in May 1978.[2] Since this issue suffices to sustain the verdict of invalidity, we do not discuss the other grounds that were asserted by Ampex. See, e.g., W.L. Gore & Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1549, 220 U.S.P.Q. 303, 309 (Fed.Cir.1983) ("In view of our affirmance of the judgment reached on claim 1 under 102(a), we need not discuss other asserted grounds of invalidity of claim 1.").

---

2. This May 1978 demonstration occurred more than a year before the May 16, 1980 filing of the continuation-in-part application that issued as the '612 patent, but less than a year before the January 16, 1979 filing of the parent United States application. Mitsubishi states by footnote in its brief that it "has always maintained" that claims 1, 2, and 11 in suit are entitled to the filing date of the parent United States application. However, on appeal Mitsubishi presents no argument or discussion in support of this position. Perforce it is abandoned.

Appendix A

II
THE '533 PATENT

The '533 patent, entitled "Digital Signal Transmission System" granted on May 12, 1987, describes a method of improving the transmission of digital data by placing synchronizing codes into a stream of data.

Ampex argued at trial that claim 1, the only claim of the '533 patent, was invalid, raising the grounds of indefiniteness, anticipation, and obviousness. The jury rendered a verdict that claim 1 was invalid, but if valid was infringed. The verdict form again did not distinguish among the asserted grounds of invalidity. Mitsubishi seeks reversal or a new trial on the issue of validity, arguing that the ground of indefiniteness is a question of law and should not have been presented for jury verdict. Mitsubishi also argues that neither anticipation nor obviousness was supported by legally sufficient evidence. Mitsubishi again argues that the verdict can not be sustained if any single ground was submitted to the jury in error. For the reasons that we deem this argument to have been waived with respect to the '612 patent, it is waived with respect to the '533 patent. Ampex cross-appeals on the issue of infringement.

The Invention

In the transmission of digital data, it was known that a segment of digital data could be represented as a matrix of rows and columns of data. The matrix as a whole constitutes a block, and a block comprises multiple frames, where each frame is equated to one row of the matrix. The prior art

transmission format consisted of a stream of frames, with a given number of frames forming a block. When transmitting digital data in a continuous stream, it was known to place synchronization codes before each frame and before each block, to be used as markers or identifiers. These identifiers would indicate where a frame or block began and where a frame or block ended. In the prior art, separate codes were used for frames and for blocks; thus two codes were needed to indicate the point in a data stream where both a new frame and a new block began.

In the method of the '533 patent, instead of using separate block and frame codes, two "frame synchronous codes" are used. One code is used for the start of a frame that also begins a new block, and a second code is used for the start of a frame that does not begin a new block. In the '533 system the start of each new block does not require insertion of two codes. Ampex argued that this change was not novel, or if novel would have been obvious to a person of ordinary skill in this field. Ampex also argued invalidity on the ground of indefiniteness of the claims.

Figures 3 and 4 of the '533 patent illustrate the invention, Figure 3 representing the prior art and Figure 4 representing the '533 invention:

Appendix A

FIG. 3

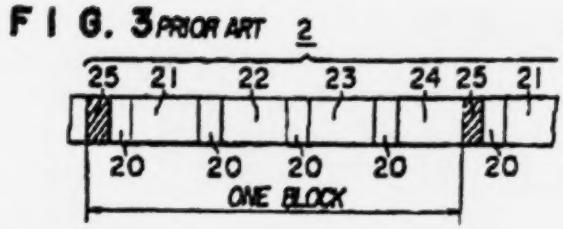


FIG. 4

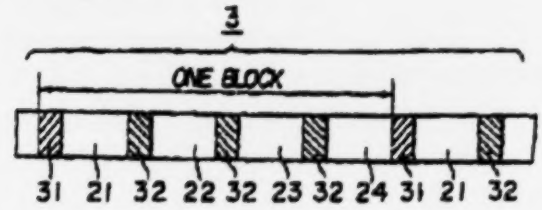


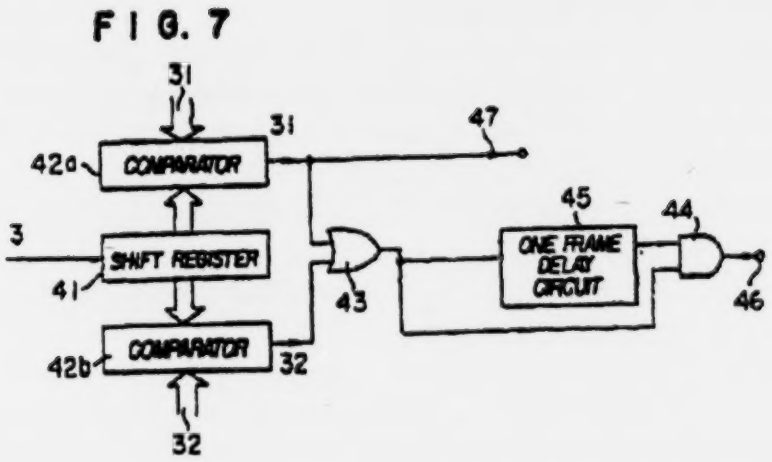
FIG. 4

In these figures (20) represents a prior art frame synchronization code, (21) through (24) represent various frames of data, (25) represents a prior art block synchronization code, and (31) and (32) represent the frame synchronous codes of the '533 invention.

The case was tried through the testimony of expert witnesses. The witnesses explained the circuitry that locates the synchronization codes or "markers" and that then reports, to the rest of the system, the beginning of a frame or the beginning of a block. This circuitry is shown in Figure 7 of the '533 patent:

Appendix A

FIG. 7



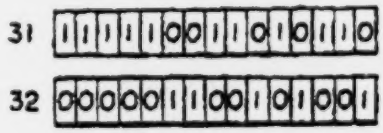
When a digital signal receiver processes an incoming serial stream of data (3) it uses a circuit called a "shift register" (41) along with "comparators" (42a) and (42b) to search for block and frame identifying codes. Each comparator checks the data stream one bit at a time, comparing the data stream pattern to a reference pattern. When, for example, a comparator finds the block synchronization code, it sends out a signal indicating the beginning of a block. In this way two signals are sent, one representing the first frame in each block and the other representing the remaining frames in each block. An OR gate analyzes these signals, looking for an output from either the block synchronization comparator circuit or the frame synchronization comparator circuit. If it detects either one, then it sends a signal to indicate the beginning of a frame. Further, because a block synchronous code represents both the beginning of a block and the beginning of a frame, the comparator 42a can cause the

circuitry to generate both a block synchronous signal and a frame synchronous signal.

Figure 5 depicts a pair of synchronous code patterns of the invention such that both codes are fifteen bits long and the second code is the binary complement of the first (111110011010110 and 000001100101001). Code (31) marks the position of only the first frame of a each block. Code (32), on the other hand, marks the position of the remaining frames. As illustrated by Figure 5 and Figure 7 of the '533 patent and as described in the specification, comparator (42a) signals if it detects 111110011010110, while comparator (42b) signals if it detects 000001100101001.

FIG.5

FIG. 5

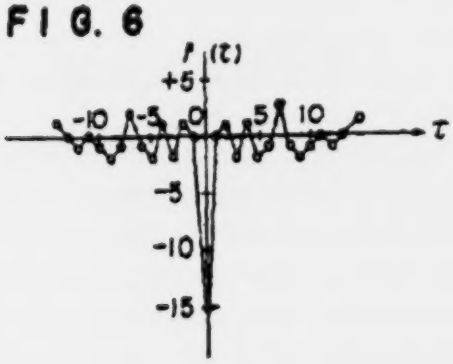


As the expert witnesses explained the technology, much attention was given to the concept of cross-correlation. The experts explained that a cross-correlation function measures the likelihood that a comparator could mistake one code for the other. On a plot of the cross-correlation function, there is a number associated with all the possible offsets of one synchronization code with respect to the other code. The cross-correlation function can be visualized by picturing the two Figure 5 codes juxtaposed, one above the other, but offset

so that the upper code is to the left of the lower code and no bits overlap. Holding the lower code stationary and moving the upper code to the right one bit at a time, first one bit overlaps the lower code, then two, and so on. At each step a calculation is made, and through this calculation a value of the cross correlation function is generated. This calculation involves focusing on where bits overlap, each overlapping bit being compared to the bit directly below it, and subtracting the number of disagreements from the number of agreements.

When the two synchronization codes of Figure 5 are lined up, one directly above the other, all bits of one code disagree with all bits of the other code. At this point, the value of the cross-correlation function is a large negative number. Figure 6 of the '533 patent shows the full graph of this function:

FIG. 6



Appendix A

Claim 1, the only claim of the '533 patent, follows:

1. In a digital signal transmission system for transmitting data by dividing a digital data signal train into frames, giving respectively frame synchronous code signals to said frames, grouping said frames into blocks, and giving a block synchronous code signal to each block, the improvement comprising:

selecting a first code pattern only for said frame synchronous code signals and a second code pattern for said block synchronous code signal and for said frame synchronous code signals, said first and second code patterns exhibiting a low cross-correlation function;

transmitting said data with only said second code pattern of said first and second code patterns inserted prior to each data block and only said first code pattern of said first and second code patterns inserted prior to each data frame within each block;

receiving and detecting each of said first and said second code patterns to produce respective first and second detection signals upon detection thereof;

combining said first and second detection signals to produce a frame synchronization signal used for frame synchronization of each data frame; and

> using said second detection signal for block synchronization of each data block.

Obviousness

The trial judge correctly instructed the jury that an obviousness determination requires consideration of the following:

> One, what was the scope and contents of the prior art at the time the alleged invention was conceived; what were the differences if any between the prior art at the time the alleged invention was conceived; what were the differences if any between the prior art and the alleged invention, that is, what does this alleged invention add to what was already known; and three, what was the level of ordinary skill in the prior art at the time the alleged invention was made.
>
> In making your determination you should also consider [secondary considerations] . . .
>
> In order to be patentable, an invention must not be obvious to a hypothetical person of ordinary skill in the art at the time the invention was made. . . .

See, e.g., Graham v. John Deere Co., 383 U.S. 1, 86 S.Ct. 684, 15 L.Ed.2d 545, 148 USPQ 459 (1966). With respect to how to analyze a combination of prior art references, the court instructed the jury as follows:

Appendix A

> The mere existence in the prior art of individual features of a patented invention does not without more invalidate the patent under the obviousness test. There must be evidence that the bringing together of such features or steps would have been obvious to an ordinarily skilled person. It is improper to combine prior art references solely because the inventor's patent itself suggests the new combination of old elements. Thus, to combine any of the teachings of the prior art there must be some teaching or suggestion supporting the combination.
>
> Further, you may not combine the features of prior products where the prior art itself teaches against the combination.

We discern no flaw in these instructions. The jury found claim 1 of the '533 patent invalid. We review this verdict for substantial evidence in support of any necessary findings of fact, and for correct application of the law to these findings.

Three references of particular relevance to the issue of obviousness are: (1) an article by Merwin W. Williard entitled "Optimum Code Patterns for PCM Synchronization," presented at the National Telemetering Conference in May 1962 (the "Optimum Codes Williard article"); (2) a second article by Williard entitled "Mean Time to Establish PCM Synchronization," presented at the National Symposium on Space Electronics and Telemetry in October 1962 (the "Synchronization Williard article"); and (3) an article by

Appendix A

G.E. Goode and J.L. Phillips entitled "Optimum PCM Frame Synchronization Codes and Correlation Detection," presented at the National Telemetering Conference in May 1961 (the "Goode and Phillips article").

Mitsubishi argues that it was improper for the Ampex witness to compare the Synchronization Williard article with Figure 7 of the '533 patent. In support of this position, Mitsubishi states that Figure 7 was directed to an abandoned claim. Mitsubishi also argues that none of the prior art references shows the fourth step of the claim: combining the signals "to produce a frame synchronization signal used for frame synchronization of each data frame." Mitsubishi also challenges the conclusion by Ampex's expert witness that based on the references there was nothing new or unobvious in the claimed invention.

The '533 patent prosecution history illuminates the relevance of Figure 7. The examiner had rejected the claims in the '533 patent application as inoperative, premised on an inadequacy in Figure 7. The rejection dealt with the relative positions of AND gate 44 and frame delay circuit 45. According to the examiner, the invention was "incapable of carrying out the frame synchronous pulse communication as described in the specification" because, in the original Figure 7, one of the inputs of the AND gate had a feedback from its own output. Responding to this rejection and in its appeal brief in the Patent Office, Mitsubishi explained that claim 6, a claim that was canceled prior to allowance, was the only claim that dealt with AND gate 44 and the delay circuit 45. In explaining this issue as it related to pending claim 5 — which issued as claim 1 of the '533 patent — Mitsubishi's stated:

Appendix A

> Claim 5, on the other hand, defines Appellant's invention in terms of the functions provided by, for example, the comparators 42a, 42b, shift register 41, and OR gate 43 in providing a block synchronization pulse signal 47 at the output of comparator 42a and in providing a frame synchronization pulse at the output of OR gate 43 shown in Figure 7. Note that the step of "combining said first and second detection signals to produce a frame synchronization signal used for frame synchronization of each data frame", as recited in claim 5, is indeed performed by the OR gate 43. Thus, the AND gate 44 and the delay circuit 45 shown in Figure 7, which are alleged by the Examiner as being inoperable, are neither used nor needed to implement the invention defined by pending Claim 5.

Thus Mitsubishi argued that except for items 44 and 45, Figure 7 showed with blocks what the claim described in words.

Ampex's expert presented sufficient evidence for the jury to find that the Synchronization Williard article teaches all but one of the elements of claim 1. The article develops equations to evaluate digital synchronization systems in terms of the time required to acquire synchronization and in terms of the percentage of data lost due to loss in pattern synchronization, and then applies the equations to the Saturn rocket telemetry systems. The article discusses a system that transmits ten-bit words and that has a most repetitive data cycle defined by a synchronization pattern (or code). Each

of these repetitive data cycles consists of twenty-seven data words plus a thirty-bit synchronization word. The system also uses a 10:1 countdown from the highest rate data cycle. The beginning of each of these countdown cycles is defined by reversing the polarity of all the bits in the primary synchronization pattern.

The Synchronization Williard article states that after primary synchronization is obtained, which is synchronization on the most repetitive pattern, synchronization on the subcycle pattern is necessary. For subcycle synchronization the system looks for a reversal of polarity of all synchronization bits in the prime synchronization pattern once every ten groups; that is, the system looks for a secondary synchronization pattern (or code) that is the complement of the primary synchronization pattern.

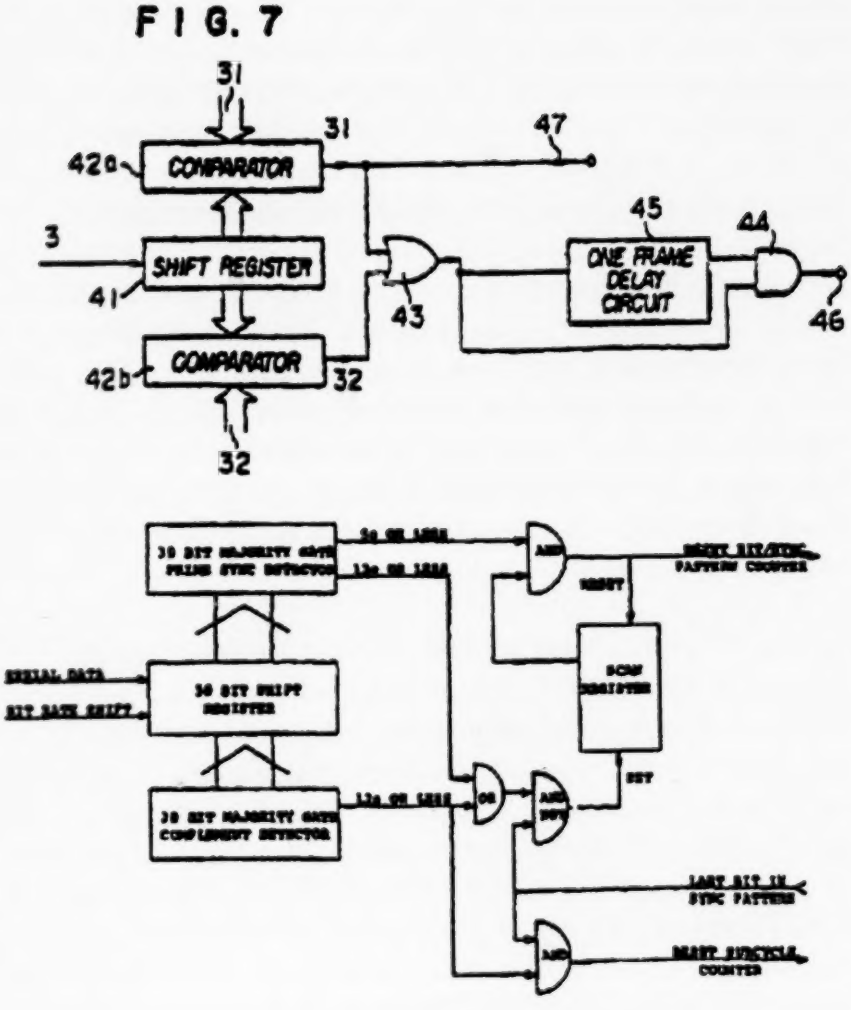
Ampex's expert testified that the thirty-bit (or primary) synchronization word marked the most repetitive data cycle or "frame" and constituted what was referred to in the '533 patent as a "frame synchronization pattern." Referring to the 10:1 countdown cycle, the Ampex expert explained that "something special [was] happening every tenth frame." The Williard system divided up the data stream into "blocks," as that term is used in the '533 patent, of ten frames, each frame beginning with the primary synchronization pattern (or thirty-bit synchronization word) and each block beginning with the complement of the primary synchronization pattern. Ampex's expert testified that what was happening in this Williard Synchronization article was the same as was happening in Figure 4 of the '533 patent.

Appendix A

When asked to compare Figure 7 of the '533 patent with Figure 3 of the Synchronization Williard article, Ampex's expert reached a similar conclusion. The expert explained that Figure 3 illustrated the synchronization detection circuitry of the Saturn system. The witness compared Figure 3 with Figure 7, and explained that the thirty-bit complement detector of Williard's Figure 3 corresponded to the block comparator circuitry of the '533 patent, and that the thirty-bit prime sync detector of Williard's Figure 3 corresponded to the frame comparator circuitry of the '533 patent. He explained that the OR gate of Williard's Figure 3 corresponded to the OR gate 43 of the '533 patent. Each OR gate signaled if either the frame signal or the block signal was detected, the OR gate signal indicating that a frame was beginning. In an element-by-element comparison between the figures, the witness explained that each figure had two comparators, one shift register, and one OR gate.

Appendix A

FIG. 7



BEST AVAILABLE COPY

Appendix A

The evidence at trial was that the Synchronization Williard article taught the use of synchronization codes that were complements of each other and that the '533 specification also taught the use of complements. However, this article did not state that its choice of codes "exhibited a low cross-correlation function," as set forth in claim 1. The jury could have found this aspect in either the earlier Williard article (the Optimum Codes Williard article) or the Goode and Phillips article, both of which were in evidence at trial and discussed by at least one of the expert witnesses. Mitsubishi argues that the earlier Optimum Codes Williard article can not be relied on for rendering the combination obvious because in this earlier article Williard taught away from complements, while the Mitsubishi invention advocates the use of complements. Mitsubishi also argues that the Goode and Phillips article does not suggest combining its teachings with the Synchronization Williard article.

The Optimum Codes Williard article, in discussing the reasons for choosing a particular secondary synchronization pattern, states that "any secondary sync pattern, though not needing any special autocorrelation properties, should have minimum cross-correlation characteristics with the primary sync pattern." Williard explained that he did not know of any equipment designed to search independently for primary synchronization and secondary synchronization, but that "if such equipment were planned it would be desirable to choose a secondary sync pattern with good autocorrelation properties and also good cross-correlation properties with the primary sync pattern." After discussing the use of complements as a possible method of minimizing cross-correlation, the earlier Williard article discussed the advantages and disadvantages

of such a use, and stated that "complements are, therefore, never the answer." Summarizing his results, Williard stated that "[s]econdary sync patterns should always be chosen to minimize cross-correlation with prime sync patterns."

Mitsubishi argues that the earlier Optimum Codes Williard article teaches away from the later Williard article, and that they would not reasonably have been combined by a person of ordinary skill in the field. Mitsubishi stresses that Williard said "complements are never the answer" in his earlier article. However, Williard teaches the use of complements in his later article. The earlier article teaches that one should minimize the cross-correlation between primary and secondary synchronization patterns. Although the earlier article states that using complements is disadvantageous, the article considers complements in the context of minimizing cross-correlation. In his later article Williard teaches the use of complements in the context of a specific system, described by the expert as teaching the preferred embodiment of the '533 invention. On this evidence, a reasonable jury could have found that by employing complements in a system that, according to the Ampex expert, is not technologically different from that of the '533 patent, the teaching of Williard's later specific article superseded the broadly stated negative teaching of the earlier article.

The Goode and Phillips article also provides for the use of complements. Both the Goode and Phillips article and the Williard Synchronization article discuss synchronization codes for telemetry systems. The Goode and Phillips article describes the use of primary and secondary synchronization

codes and recommends that one should first choose a code with, among other things, a good autocorrelation function. Then, the article suggests using the complement of the first code, for the complement would have the same favorable properties as the first code, such as the same autocorrelation function. The Goode and Phillips article states: "When the original code is received a large positive spike is produced at sync time but when the complement of the original code is received an equally large negative spike is produced. Hence, both of these maximally distinguishable codes may be detected and separated in an efficient manner."

Mitsubishi argues that the Goode and Phillips article is inapposite, stating that Goode and Phillips discuss the concept of "cyclic" cross-correlation instead of the "non-periodic" cross-correlation of the '533 patent. However, Mitsubishi's expert, like the prosecution history, explained that the term "autocorrelation" is highly relevant to the cross-correlation of the codes. The expert testified that "autocorrelation is what you get if you calculate cross-correlation when the two things you are comparing are identical." He then explained that "instead of calling [this] cross-correlation, you call this autocorrelation, the comparison of a pattern with itself as you shift it in time against itself." The Ampex expert testified that the Goode and Phillips article disclosed codes with a small cross-correlation function. The Goode and Phillips article, like the '533 prosecution history, teaches that when choosing a primary and secondary synchronization pattern, one should first select a code with a good autocorrelation function and then select its complement. In view of the expert testimony and the documentary evidence, a reasonable jury could have

concluded that the Goode and Phillips article would have taught one of ordinary skill in the field to use complementary synchronization codes and that such codes would have exhibited a small (or low) cross-correlation function, as claimed in the '533 patent.

We have carefully considered Mitsubishi's criticisms of the evidence of obviousness. We conclude that the suggestion to combine the subject matter of the Synchronization Williard article with code patterns exhibiting a low cross-correlation function could reasonably have been found in the Optimum Codes Williard article or the Goode and Phillips article. On the evidence and the explanations of the expert witnesses, a reasonable jury could have concluded that the second Williard article in combination with either the first Williard article or the Goode and Phillips article provided all of the elements of the claimed invention, and that the invention as a whole would have been obvious to a person of ordinary skill in this specialized field.

In denying Mitsubishi's post-trial motions the district court remarked: "what you had in this case was two competing scientific technological witnesses, one of whom claimed that the invention was invalid . . . and the other who claimed it was not." The court commented that "the jury apparently chose to believe the one witness over the other." We take the district court's remark as a forthright evaluation of the proceedings at trial. It is well recognized that the persuasiveness of the presentation of complex technology-based issues to lay persons depends heavily on the relative skill of the experts. See generally Kumho Tire Co. v. Carmichael, 526 U.S. 137, 119 S.Ct. 1167, 143 L.Ed.2d 238

(1999); Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993); Fed.R.Evid. 702 ("If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise."). The issue at trial was the conclusions to be drawn from the evidence, raising issues of evaluation, weight, and, as the trial judge remarked, credibility. On appeal, the admissibility of the scientific and technologic evidence presented by the experts for both sides is not challenged. We conclude that the judgment of invalidity on the ground of obviousness is supported by the evidence and must be affirmed. We thus do not reach the other grounds of invalidity. The conditional cross-appeal is dismissed.

Costs

Costs to Ampex.

AFFIRMED

APPENDIX B — ORDER OF THE UNITED STATES DISTRICT COURT FOR THE CENTRAL DISTRICT OF CALIFORNIA DENYING PLAINTIFF'S MOTION FOR JUDGMENT AS A MATTER OF LAW OR FOR A NEW TRIAL DATED AND FILED JUNE 30, 1997

UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA

CV 95-8236-ER (VAPx)

MITSUBISHI ELECTRIC CORP.,

Plaintiff,

v.

AMPEX CORP.,

Defendant.

ORDER DENYING PLAINTIFF'S MOTION FOR JUDGMENT AS A MATTER OF LAW OR FOR A NEW TRIAL

Plaintiff Mitsubishi's Motion for Judgment as a Matter of Law, or in the Alternative for a New Trial, came before the Honorable Edward Rafeedie on June 30, 1997, in Courtroom 1. The Court, having read and considered the papers filed in support of and in opposition to the motion, and having considered oral argument of counsel, HEREBY DENIES the motion for the reasons stated in open Court, as reflected in the court reporter's notes.

Appendix B

IT IS SO ORDERED.

IT IS FURTHER ORDERED that the Clerk of the Court shall serve, by telefax or by United States mail, copies of this Order on counsel for the parties in this matter.

Dated: June 30, 1997

s/ Edward Rafeedie
EDWARD RAFEEDIE
Senior United States District Judge

APPENDIX C — SPECIAL VERDICT FORM OF THE UNITED STATES DISTRICT COURT FOR THE CENTRAL DISTRICT OF CALIFORNIA DATED AND FILED MARCH 26, 1997

IN THE UNITED STATES DISTRICT COURT
FOR THE CENTRAL DISTRICT OF CALIFORNIA

CASE NO. 95-8236 ER (VAPx)

MITSUBISHI ELECTRIC CORPORATION,
a Japanese corporation,

Plaintiff,

vs.

AMPEX CORPORATION,
a Delaware corporation,

Defendant.

SPECIAL VERDICT FORM

SPECIAL VERDICT

We, the jury, unanimously find as follows:

I. *INFRINGEMENT*

1. Do you find that plaintiff Mitsubishi has shown by a preponderance of the evidence that defendant Ampex's making, use or sale of the VPR and DCT product lines

literally infringes the claim of the '533 patent? (A "YES" answer to this question is a finding for Mitsubishi. A "NO" answer is a finding for Ampex.)

Yes	No
✓	

If your answer to question number 1 is "Yes," skip question number 2 and proceed to question number 3. If your answer to question number 1 is "No," proceed to question number 2.

2. Do you find that plaintiff Mitsubishi has shown by a preponderance of the evidence that defendant Ampex's making, use or sale of the VPR and DCT product lines infringe the claim of the '533 patent under the doctrine of equivalents? (A "YES" answer to this question is a finding for Mitsubishi. A "NO" answer is a finding for Ampex.)

N/A

3. Do you find that plaintiff Mitsubishi has shown by a preponderance of the evidence that defendant Ampex's making, use or sale of the VPR, DCT, DIS, and DST product lines literally infringes any one of the following claims of the '612 patent? (A "YES" answer to this

question is a finding for Mitsubishi. A "NO" answer is a finding for Ampex.)

	Yes	No
Claim 1	___	✓
Claim 2	___	✓
Claim 3	___	✓
Claim 11	___	✓

If your answer with respect to each claim in question number 3 is "Yes," skip question number 4 and proceed to question number 5. If your answer to any claim in question number 3 is "No," proceed to question number 4 and answer it only as to those claims.

4. Do you find that plaintiff Mitsubishi has shown by a preponderance of the evidence that defendant Ampex's making, use or sale of the VPR, DCT, DIS, and DST product lines infringes any one of the following claims of the '612 patent under the doctrine of equivalents?

(A "YES" answer to this question is a finding for Mitsubishi. A "NO" answer is a finding for Ampex.)

	Yes	No
Claim 1	___	✓
Claim 2	___	✓
Claim 3	___	✓
Claim 11	___	✓

II. *WILLFUL INFRINGEMENT*

Answer question number 5 if you have answered one of questions 1 or 2 "Yes." Otherwise, skip this question and proceed to question number 6.

5. Do you find that plaintiff Mitsubishi has shown by clear and convincing evidence that defendant Ampex willfully infringed the '533 patent? (A "YES" answer to this question is a finding for Mitsubishi. A "NO" answer is a finding for Ampex.)

Yes	No
___	✓

Appendix C

Answer question number 6 if you have answered either question 3 or 4 "Yes" as to any claim. Otherwise, skip this question and proceed to question number 7.

6. Do you find that plaintiff Mitsubishi has shown by clear and convincing evidence that defendant Ampex willfully infringed the '612 patent? (A "YES" answer to this question is a finding for Mitsubishi. A "NO" answer is a finding for Ampex.)

N/A

III. *VALIDITY*

7. Do you find that defendant Ampex has shown by clear and convincing evidence that claim 1 of the '533 patent is invalid? (A "YES" answer to this question is a finding for Ampex. A "NO" answer is a finding for Mitsubishi.)

Yes	No
✓	___

8. Do you find that defendant Ampex has shown by clear and convincing evidence that any one of the following claims of the '612 patent is invalid? (A "YES" answer to

this question is a finding for Ampex. A "NO" answer is a finding for Mitsubishi.)

	Yes	No
Claim 1	✓	___
Claim 2	✓	___
Claim 3	✓	___
Claim 11	✓	___

IV. *DAMAGES*

Answer question 9 if you found that the '533 patent was infringed and not invalid, or that any claim of the '612 patent was infringed and not invalid, or both.

9. If you found any of the claims of the '533 and '612 patents infringed, and you did not find such claim or claims to be invalid, what amount of damages in the form of a reasonable royalty do you find plaintiff Mitsubishi has proven by a preponderance of the evidence:

Damages: $ N/A

Dated: March 26, 1997, at Los Angeles, California.

s/ [illegible]
Foreperson

APPENDIX D — ORDER OF THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT DENYING PETITION FOR REHEARING DATED AND FILED NOVEMBER 1, 1999

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

ORDER

A combined petition for rehearing and suggestion for rehearing en banc having been filed by the APPELLANT, and a response thereto having been invited by the court and filed by the CROSS-APPELLANT, and the petition for rehearing having been referred to the panel that heard the appeal, and thereafter the suggestion for rehearing en banc and response having been referred to the circuit judges who are in regular active service,

UPON CONSIDERATION THEREOF, it is

ORDERED that the petition for rehearing be, and the same hereby is, DENIED and it is further

ORDERED that the suggestion for rehearing en banc be, and the same hereby is, DECLINED.

The mandate of the court will issue on November 8, 1999.

Appendix D

FOR THE COURT,

s/ Jan Horbaly (AV)
Jan Horbaly
Clerk

Dated: November 1, 1999

MITSUBISHI ELECTRIC V AMPEX CORP, 97-1502, -1538
(DCT – 95-CV-8236)